

Study Groups

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Study Group 15 Transport networks, systems and equipment

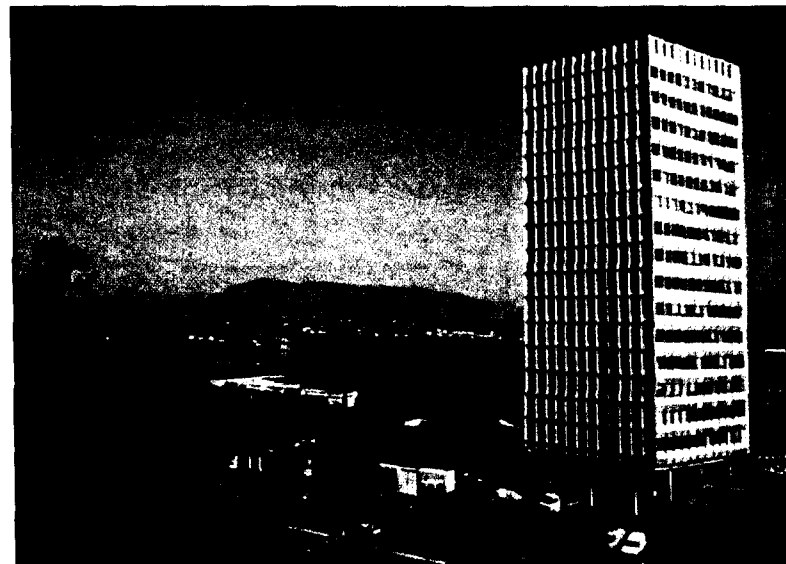
Study Group 16 Multimedia services and systems

Telecommunication Development Sector

Study Group 1 Telecommunication development strategies and policies

Study Group 2 Development, harmonization, management and maintenance of telecommunication networks and services including spectrum management

ITU Headquarters, Geneva



Global Standards Development, TIA Participates in the Effort

by **Dan Bart**, Vice President, Standards and Technology, TIA

Eric J. Schimmel, Vice President, Mobile and Personal Communications and Network Equipment Divisions, TIA

Global standards remain essential to any international business plan, especially with the developing Global Information Infrastructure (GII) enabling corporations to transform themselves from national companies to international powerhouses. The largest barrier to any international effort is the specter of incompatible standards and regulations, stymieing the intended benefits of lower tariffs. The telecommunications industry is unusual and fortunate because of the presence of the International Telecommunication Union (ITU), which is composed of 185 nations, as well as other standards entities and large corporations, engaged in the development of global standards.

With corporate intranets, Internet communications and value-added private networks ushering in a new era of information-energized commercial and consumer markets, telecom equipment manufacturers and service providers are increasingly relied upon to ensure compatible technologies on a global scale. At stake are billions of dollars of investments, critical applications such as electronic commerce and, in some cases, entire national economic plans. Without global standards, the development and implementation of these important goals and objectives are endangered. While the U.S. telecom industry and its primary standards bodies, TIA and Committee T1, sponsored by the Alliance for Telecommunications Industry Solutions, have taken a commanding lead in the development of new domestic communications information technologies, global markets demand the establishment of international standards.

The U.S. Department of State submits contributions from national standards bodies and entities such as private corporations to the ITU, the United Nations organization empowered by the governments of the world to create international telecom standards. The ITU is responsible for much more than standardization — its mission also includes the fostering of the GII. But the backbone of the ITU's efforts lies in its standards efforts. It is here that international, compatible telecommunications are made possible.

TIA enjoys close collaboration, via the U.S. Department of State, with the ITU and has acquired considerable experience within this international standards body. Notice in this issue of *STAR* the individual committee contributions to the ITU via the U.S. Department of State. TIA personnel and committee members are currently engaged in ITU work, including participation in World Telecommunication



(From l to r) Dan Bart, TIA vice president of standards and technology, Theo Irmer, director of the ITU-T and Arthur K. Reilly, former chairman of Committee T1, met in Geneva, Switzerland, to discuss the standards aspects of the Global Information Infrastructure (GII) at the International GII Seminar.

Standardization Conferences (WTSC), World Radiocommunication Conferences (WRC), the World Telecommunication Policy Forum (WTPF), the Telecommunication Standardization Advisory Group (TSAG) and the Radiocommunication Advisory Group (RAG). TIA participates in the ITU Radiocommunication Sector as the U.S. Chair of Working Party 8A and also chairs several working groups in the ITU Telecommunication Standardization Sector. In addition, TIA organizes USA Pavilions at the quadrennial ITU-sponsored World TELECOM events and the regional TELECOM shows.

TIA's involvement in ITU-related activities allows the Association to communicate U.S. member interests in developing the GII. At a recent ITU conference, TIA participated with representatives from 129 countries to agree on a set of guidelines for the deployment of Global Mobile Personal Communications by Satellite (GMPCS) systems. And, in no place is this active participation more important than in the ITU's standards bodies where telecom equipment compatibility is the goal.

The work done in TIA's engineering committees is doubly important, both in the development of national standards as well as United States' contributions to the ITU. Standards development facilitates economic growth as well as a new, better way of life. It is through this work that TIA engineering committees contribute to society, the nation and the world community as a whole. •

Deploying U.S. Cellular Standards

Country	AMPS ¹	CDMA ²	TDMA ³	Country	AMPS ¹	CDMA ²	TDMA ³
Angola	○			Jamaica	○		
Anguilla	○			Japan		○	
Antigua	○			Kazakhstan	○		
Argentina	○		○	Korea	○	○	
Aruba	○		○	Laos	○		
Australia	○			Lebanon	○		
Bahamas	○		○	Madagascar	○		
Bangladesh	○			Malaysia	○		○
Barbados	○			Martinique	○		
Barbuda	○			Mexico	○		○
Belize	○		○	Montserrat	○		
Bermuda	○		○	Myanmar	○		
Bolivia	○			Nauru	○		
Botswana	○			Netherlands Antilles	○		
Brazil	○		○	New Zealand	○		○
Brunei	○			Nicaragua	○	○	
Burma	○			Pakistan	○		
Burundi	○			Papua New Guinea	○		
Cambodia	○			Paraguay	○		
Canada	○	○	○	Peru	○	○	○
Cayman Islands	○			Philippines	○	○	○
Chile	○		○	Poland		○	
China	○	○	○	Puerto Rico			○
Colombia	○		○	Russia	○	○	○
Costa Rica	○		○	Samoa (American)	○		
Cote d'Ivoire	○			Singapore	○	○	
Cuba	○			Sri Lanka	○		
Curaçao	○			St. Kitts/Nevis	○		
Dominican Republic	○	○		St. Lucia	○		
Ecuador	○		○	St. Martin/Barthelemy	○		
El Salvador	○			St. Vincent	○		
Gabon	○			Surinam	○		○
Georgia	○			Taiwan	○		
Ghana	○			Thailand	○	○	
Grenada	○			Tonga	○		
Grenadines	○			Turkmenistan	○		
Guadeloupe	○			Ukraine			○
Guam	○			United States	○	○	○
Guatemala	○			Uruguay	○		○
Guinea	○			Uzbekistan	○		○
Guyana	○			Venezuela	○		○
Honduras	○			Vietnam	○		
Hong Kong	○	○	○	Yemen		○	
India		○		Zaire	○	○	
Indonesia	○	○	○	Zambia	○	○	
Israel	○	○	○	Total	85	20	28

¹AMPS (Advanced Mobile Phone Service) is based on TIA/EIA-553, Mobile Station-Land Station Compatibility Standard.

²CDMA (Code Division Multiple Access) is based on the TIA/EIA-IS-95-B, Mobile Station-Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System.

³TDMA (Time Division Multiple Access) is based on the TIA/EIA-IS-54-B, Cellular System Dual-Mode Mobile Station-Base Compatibility Standard.

Data collected from industry sources as of November 1996.

Mobile and Personal Private Radio Standards

TR-8 is responsible for private radio communications systems, services and equipment, including voice and data applications. Within the telecommunications industry, TR-8 relates to all technical matters and the promulgation of standards in various forms, including system and service definitions, along with interoperability, compatibility and compliance requirements for systems and services. The Committee's most important documents include methods of measurements and performance expectations for various elements of private radio communications systems.

Increasing demand for improved service and spectrally efficient systems is causing significant changes to mobile and personal private radio equipment. The technology changes proposed to satisfy these demands have resulted in the need to formulate new standards essential for users to effectively implement the revolutionary changes. Since 1944, TR-8 has continued in its senior role within TIA to generate the documents necessary to satisfy user needs.

1996 Activities

TR-8, its subcommittees, task and working groups held five concurrent meetings, with a number of teleconferences and single group meetings also taking place. Many of these meetings were held coincident with user group meetings. Activity for 1997 will continue at the same or a higher level. Highlights of 1996 work include the following:

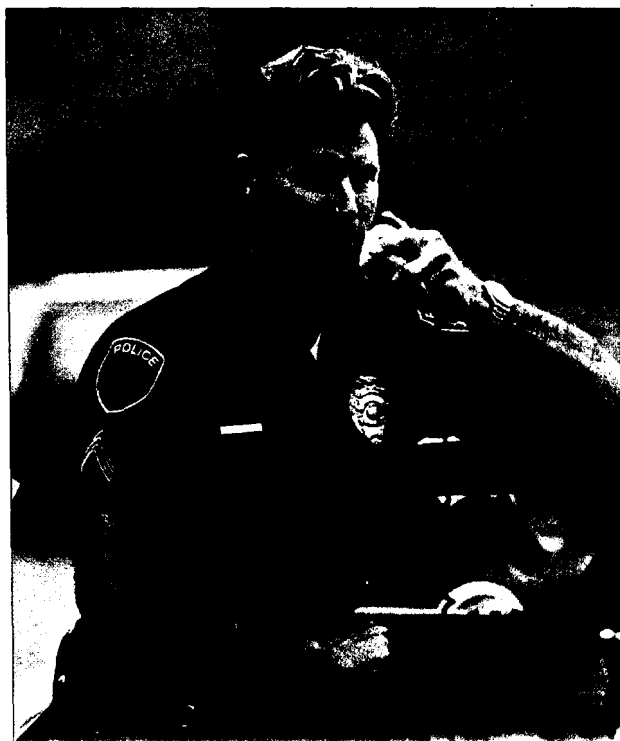
- TR-8 published Telecommunications Systems Bulletin TSB-78, Land Mobile Linear Analog Modulation Communications Equipment Measurement and Performance Standards, for narrow band equipment employed in the 220 MHz frequency band.
- TR-8 continued its work on the development of a description of an analog port for land mobile radios. This port will allow data transmission through conventional FM radios. It is expected that this will permit higher data rates than present methods which use a microphone port. A draft document is currently under consideration.
- Methods necessary to evaluate the impact of new technology applications are the subject of a draft report released by the Committee's Working Group 8.8, Technology Compatibility. The draft report has been distributed to the Federal Communications

Commission (FCC) and some frequency coordination activities are underway.

- Task Group 8.16's efforts on the Enhanced Digital Access Communications Systems (EDACS) and standards definition draft continue.
- Documents supporting the Association of Public-Safety Communications Officials (APCO) Project 25 continue to be published. Currently, 31 documents have been approved for publication. These documents now provide a complete description of the Project 25 system, including trunking and interfaces.

During the transition by users to implement new technology, TR-8 is required to maintain and update existing standards, mainly ANSI/TIA/EIA-603, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards, covering equipment operating with current technology. In addition, the FCC has published revised rules for land mobile equipment which will require an addendum to ANSI/TIA/EIA-603, expected to be published in early 1997.

TR-8 monitors activity in the international standards arena through attendance by some Committee members in concert with the TIA staff. At present ANSI/TIA/EIA-603 has been placed on the International Telecommunication Union (ITU) agenda for international consideration.



George Kameron



Chair, TR-8
Consultant,
Transcript International Ltd.

vice chair:

TR-8 John Oblak
E.F. Johnson Company

In keeping with the advocacy for technology flexibility, the Technology Compatibility Working Group (WG-8.8) was established to deal with the impact of different technologies sharing the same spectrum. This group, with chairmen David Brown, Ericsson, and Greg Stone, U.S. Immigration and Naturalization Service, considers the complex issues which can result from spectrum sharing. The group has prepared and issued a draft report, with contributions from industry and users. A final report is expected in early 1997. The results of WG-8.8 efforts on shared spectrum will be of direct benefit to users, regulators, coordinators, and equipment and system designers.

TR-8 continues to expend effort toward the formulation of APCO Project 25 documents. This effort, coordinated with the APCO/TIA Interface Committee (APIC), has resulted in the release for publication of documents describing equipment and systems applicable to the APCO Project 25 Standard. The document suite now includes trunking systems as well as interface standards. The Project 25 outcome is the result of unprecedented cooperation between users and TR-8 participants representing the manufacturers. The forums provided by both APIC and TR-8 have allowed participation from all facets of users and industry. While many of the standards issues have been debated, the increased understanding of differing points of view has created a legion of solutions and new ideas which will benefit users, industry and the public at large. Many of the documents are being considered as federal standards and parts of the documents have been proposed to international standards bodies as well. •

subcommittees:

Equipment Measurement Procedures

Chair: John Oblak
E.F. Johnson Company

Signaling and Data Transmission

Chair: Brad Wiseman
Garmin International

Equipment Performance Recommendations

Chair: Al Wieczorek
Motorola, Inc.

Trunking and Conventional Control

Chairs: Richard Comroe & Ed Kelly
Motorola, Inc. & Ericsson

Antennas

Chair: Dale Horn
Allen Telecom Group Inc.

ACBS Standards

Chair: Norm Shively
SEA Inc. of Delaware

Common Air Interface

Chair: Alan Wilson
Motorola, Inc.

working groups:

WG-8.3 Encryption

Chair: Eric Ziolk
Motorola, Inc.

Vocoder

Chair: Jim Holthaus
Transcript International Ltd.

Technology Compatibility

Chairs: David Brown & Greg Stone,
Ericsson & U.S. Immigration and
Naturalization Service

task groups:

EDACS Task Group

Chairs: Dominick Arcuri & Mike Sasuta
Ericsson & Motorola, Inc.

Point-to-Point Communications Systems

TR-14 is responsible for standards and recommended practices related to terrestrial fixed point-to-point radio communications equipment and systems primarily in the frequency bands above 960 MHz. The Committee is sponsored by the Fixed Point-to-Point Microwave Section of TIA within the Network Equipment Division.

Of TR-14's subcommittees, only TR-14.7 and TR-14.11 are currently active. In June 1996, TR-14.7 completed the revision of Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, ANSI/TIA/EIA-222-F-96, and it was approved by the American National Standards Institute (ANSI). The revision is substantially a reaffirmation of TIA/EIA 222-E, with most changes made to clarify content. The major content change was the addition of more comprehensive information related to corrosion protection for guy anchors. TR-14 has begun the planning process for the next revision. Issues to be reviewed will be changing the "Basic Wind Speed" from fastest mile per hour to three-second gusts and changing for Allowable Stress Design to Load Reduction Factor Design.

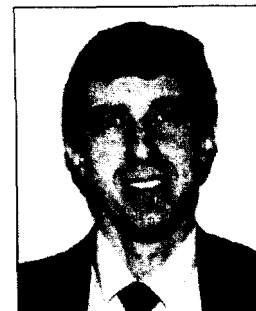
1996 Activities

Subcommittee TR-14.11 nearly completed its work on Telecommunications Systems Bulletin TSB-10-G, Interface Criteria for Microwave Systems. The major efforts were to include a section on radar interference into microwave receivers (Section 5), improve and expand the ability to calculate adjacent channel interference (Annex A), enhance the accuracy of video performance calculations (Annex C), and refine some of the Personal Communications Services (PCS)-to-microwave interference calculations (Annex F).

In addition, TR-14.11 has been participating in the Joint Working Group project with TIA's Satellite Communications Division's TR-34.2, Spectrum and Orbit Utilization, to address joint spectrum sharing issues in the 2 GHz frequency band. The meetings have created a mechanism for participants on both sides of the issue to address the technical concerns and types of methodologies and baselines necessary to produce a spectrum sharing document. Possible spectrum sharing between the two industry sectors offers an industry solution for utilizing limited spectrum resources, thereby minimizing the need for Federal Communications Commission (FCC) involvement. In addition, if spectrum

sharing feasibility is determined, it would increase the band's spectrum efficiency by accommodating additional applications.

In a letter to the FCC, the TR-14.11/TR-34.2 Joint Working Group, chaired by David Carroll, Motorola, Inc., set a timetable for its study, with an expected final report to be produced 9 to 12 months after the group's formal goals are recognized. •



Philip Salas

*Chair, TR-14
Senior Director-Radio Product Development,
Alcatel Network Systems, Inc.*

subcommittees:

TR-14.3 Station Grounding
Chair: vacant

**Standard Microwave
Transmission Systems**
Chair: vacant

**Structural Standards for Steel Antenna
Towers and Antenna Supporting Structures**
Chair: Larry McPherson
Alcatel Network Systems, Inc.

**Electrical and Mechanical Characteristics
for Terrestrial Microwave Relay Systems
Antennas and Passive Reflectors**
Chair: vacant

**Electrical Performance Standards
for Television Relay Facilities**
Chair: vacant

Interface Criteria for Microwave Systems
Chair: M. Philip Salas
Alcatel Network Systems, Inc.

Waveguide Components
Chair: vacant

Facsimile Systems and Equipment

TR-29's scope of interest is standards relating to facsimile terminal equipment and systems, and their interfaces with communications equipment, other facsimile terminal equipment and transmission media. Standards produced by TR-29 include functional, electrical and mechanical characteristics, as well as communications protocols. TR-29's work on facsimile refers to any system that principally transmits and receives still, rasterized images, not motion or freeze-frame video. Point-to-point and multipoint facsimile and audiographic services also are included among the Committee's areas of interest. The Committee additionally is responsible for the development of U.S. positions on facsimile and audiographic conferencing systems issues into international standards forums.

TR-29's contributions to the development of facsimile standards, both nationally and internationally, led to the publication of the Group 3 Facsimile Standard in 1980. After several enhancements to this standard, the Committee now is focused on the next generation of fax capabilities, such as simultaneous transmission of voice and facsimile in the same telephone connection, commercial secure facsimile (an encryption, tamper-free technology), color facsimile and facsimile on the Internet. Color facsimile and Internet facsimile, with their increasing market demand, along with secure fax, are expected to become more prominent not only in the Committee, but also among the general public in the coming years.

1996 Activities

TR-29 continued its work on color fax, including initial work on the capability to transmit a mixed mode page containing both continuous tone color and ordinary text. Enhanced facsimile protocols that will reduce transmission time and increase functionality have also been a focus of TR-29's work.

On the international front, Subcommittee TR-29.1, Binary File Transfer, made several important contributions to the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Study Group 8, Characteristics of Telematic Systems, during 1996. In particular, a new international Recommendation T.33 on fax routing

(based largely on TIA/EIA IS-141, Routing of Group 3 Facsimile Messages Utilizing the Subaddress) and an updated T.434 Recommendation on a binary file transfer format were approved. The Group 3 Fax Protocol Recommendation T.30 was also enhanced to support the latest generation V.34 modems which can operate at speeds of up to 33.6 kbits/s. Work is also proceeding on new aspects of facsimile standards, including extended negotiations, enhanced binary file transfer and simultaneous voice and fax.



Stephen J. Urban

*Chair, TR-29
Vice President Imaging Systems,
Delta Information Systems*

subcommittees:

TR-29.1 Binary File Transfer
Chair: David Duehren
Brooktrout Technology

Facsimile Digital Interfaces
Chair: Vivian Cancio
Xerox

Audiographics Teleconferencing
Chair: Bruce DeGrasse
BJ Communications

Secure Facsimile
Chair: Bob Robinson
Ilex Systems

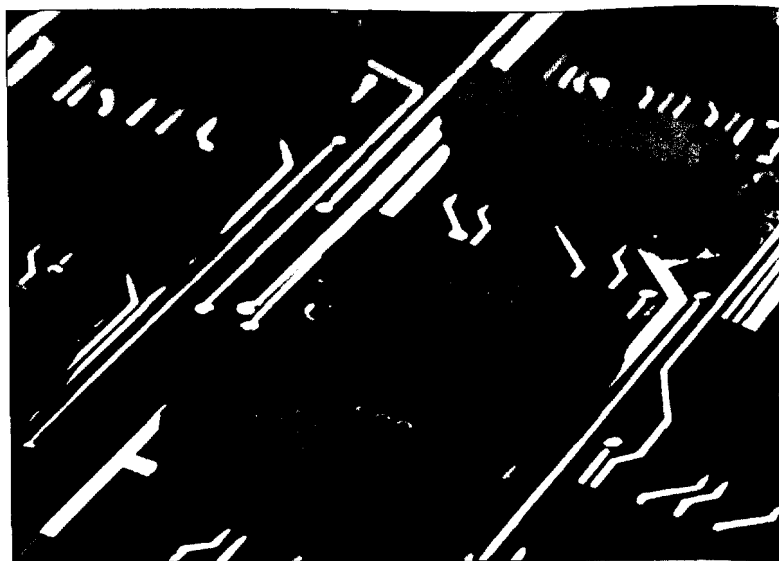
task groups:

Task Group on Facsimile Routing
Chair: Jim Rafferty
Human Communications

Task Group on Telephone Answering Device Compatibility
Chair: Lloyd McIntyre
Xerox

Further milestones were also achieved as a result of submissions from Subcommittee TR-29.2, Facsimile Digital Interfaces, which resulted in new amendments to the international ITU-T Recommendations T.31 and T.32 for controlling computer fax devices. The international Recommendations are based largely on TIA/EIA-578-A, Facsimile DCE Control Standard - Service Class 1, and TIA/EIA-592, Asynchronous Facsimile DCE Control - Service Class 2.

Additionally, Subcommittee TR-29.3, Audiographics Teleconferencing, has been extremely active in developing standards for audiographic conferencing services used in desktop conferencing and video conferencing. TR-29.3 is primarily concerned with the T.120 Series of Audiographics Conferencing Recommendations being developed by the ITU. These Recommendations collectively define set data protocols for a wide range of multimedia conferences. Through the TR-29.3 Subcommittee, the United States has made significant contributions to a number of Recommendations and also has primary editorial responsibility for T.124, Generic Conference Call; T.125, Multipoint Communication Service Protocol Specification; and T.126, Multipoint Still Image and Annotation Conferencing Protocol. Current new work includes standards for the handling of



conferencing reservations, an application-sharing protocol, and high-level control of audio/video streams.

Looking ahead to 1997, TR-29 is again breaking new ground in extending the reach and scope of facsimile communications. Projects have been initiated in Internet fax, multimedia fax and advanced fax which promise to continue the tradition of standards innovation for which the Committee has become well-known in the United States and international standards arenas. •



Data Transmission Systems and Equipment

TR-30 is responsible for standards relating to the functional, electrical and mechanical characteristics of interfaces between Data Circuit Terminating Equipment (DCE) and Data Terminal Equipment (DTE), the telephone network and other DCEs.

TR-30 was originally established in the mid 1960s to specify a standard interface between computers and modems, then called data sets. The work of the Committee resulted in the popularly known RS-232. Today, its subcommittee work still involves updating the "232" interface, now known as ANSI/TIA/EIA-232-E-91, Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange.

1996 Activities

TR-30 continued to be the primary source of U.S. input to the International Telecommunication Union-Telecommunication Standardization Sector Study Group 14 (ITU-T SG 14), as well as providing the input for the primary physical layer to Subcommittee X3S3, the Technical Advisory Group (TAG) to the International Organization for Standardization/International Electrotechnical Commission Joint Technical Committee 1 Subcommittee 6 (ISO/IEC JTC1/SC 6). In 1997, TR-30 will be the primary source of input to the newly formed Study Group ITU-T SG 16, Multimedia Services and Systems.

The focus of TR-30's work in 1996 was Simultaneous Voice/Data (SVD) which allows a single voice connection to concurrently carry audio and visual data, such as the technology found in a video phone. This technology is extremely important as it will allow new applications for modems and will be a boost for small businesses concerned about duplicative equipment. Work on SVD will continue into 1997, but a new activity started in late 1996 will also share the spotlight. This is the new Pulse Code Modulation (PCM) Modem which could have a major application as an Internet Server modem because of its ability to provide a high-speed channel (up to 56 kbt/s) from the server to the user and a lower speed (28 kbt/s) toward the server.

During 1996, Subcommittee TR-30.1, Modems, continued to be the leading contributor to standards relating to modems, including modem control, maintenance error control and line signals. TR-30.1 was the primary developer of U.S. input to ITU-T SG 14's modem work. The most signifi-



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vice chair:

TR-30 Fred Lucas
General DataComm Inc.

subcommittees:

Modems

Chair: Les Brown
Motorola Information Systems Group

DTE-DCE Interfaces

Chair: Fred Lucas
General DataComm Inc.

Data Communications Equipment Evaluation and Network Interfaces

Chair: Jack Douglass
Sierra Semiconductor

DTE-DCE Protocols

Chair: Jay Bain
Motorola Information Systems Group

cant result of TR-30's contributions is the new ITU-T V.70 series of Recommendations for Simultaneous Voice and Data and Recommendation V.8bis, which allows for the detection and negotiation of different modes of operation supported by terminals connected to the Public Switched Telephone Network (PSTN).

The Subcommittee's new PCM modem work will most likely be the primary focus of its activities for 1997.

However, the refinement of the suite of Recommendations for Digital Simultaneous Voice and Data (DSVD) will continue, along with work on Analog Simultaneous Voice and Data (ASVD), temporarily known as V.34Q.

In 1996, Subcommittee TR-30.2, DTE-DCE Interfaces, worked on TIA/EIA-688, DTE/DCE Interface for Digital Cellular Equipment. It is expected that the work will be completed and the standard forwarded to TIA for publication in

early 1997. TIA/EIA-687, Medium Speed Interface for Data Terminal Equipment and Data Circuit-Terminating Equipment, was re-balloted. The revision of EIA-485, Standard for Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems, to TIA/EIA-485-A is expected to be released for industry ballot in early 1997.

The standard TIA/EIA-694, Electrical Characteristics for an Unbalanced Digital Interface for Data Signaling Rates up to 512 kbt/s, was also completed by TR-30.2 during 1996. Revision of EIA/TIA-232-E, Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange, was begun at the June 1996 meeting and is expected to go to industry ballot in early 1997 and to be published as TIA/EIA-232-F.

In addition to its ongoing work, TR-30.2 will be working in 1997 on a revision of Telecommunications Systems Bulletin TSB-54, DTE/DCE Interface Selection Guide. This work will update TSB-54 to address changes made to existing standards as well as inclusion of references made to new standards completed by TR-30.2. A standard for a Telephone Line Interface for Personal Computer Memory Card International Association (PCMCIA) Modems and a High Speed 232 DTE/DCE Interface will provide an interface similar to TIA/EIA-232-E, which will have a maximum data rate of 512 kbt/s. It is expected that this new standard will be ready for industry ballot late in 1997.

During 1996, the focus of Subcommittee TR-30.3, Data Communications Equipment Evaluation and Network Interfaces, was to develop standards for Test Procedure for Evaluation of 2 Wire 4 kHz Voiceband Duplex Modems, adopted by the ITU as ITU-T Recommendation V.56ter. PSTN Transmission Model for Evaluating Modem Performance is a revision of TSB-37-A to more accurately document the Transhybrid Loss (THL) values that occur on the network and add a new impairment combination table for local connections. Work was also completed on a corresponding revision of TSB-38, General Test Procedures for Modem Evaluation. It is expected that the revisions of both of these TSBs will be completed in early 1997.

Another Subcommittee TR-30.3 project, a Cellular Network Transmission Model for Evaluating Modem Performance, can be used to evaluate and compare the performance of modems that connect to the cellular network. Similarly, Test Procedures for Evaluation of Cellular

Modems can be used to evaluate the performance of modems that connect to the PSTN through a cellular network and is also a focus of the Subcommittee's work.

During 1997, TR-30.3 will work on standards for Low-Bit-Rate Multimedia Testing for the evaluation and comparison of the performance of Low-Bit-Rate Multimedia modems (DSVD and ASVD) and a Transmission Model for Evaluating PCM Modem Performance, a network model that can be used to evaluate and compare the performance of PCM modems.

In 1996, Subcommittee TR-30.4, DTE-DCE Protocols, continued to be a major contributor to the work of ITU-T Study Group 14. Extensions to Asynchronous Serial Automatic Dialing and Control was an input document to ITU-T SG 14 regarding enhancements to Recommendation V.25ter. ITU-T Recommendation V.25ter, which became Annex A, was approved during 1996. In addition, a project entitled Voice/Data Multiplexing in DCEs - DTE-DCE Interface Operations, was submitted to ITU-T SG 14 for the development of voice/data multiplexing protocols and control between DTE and DCE equipment. ITU-T Recommendation V.80 was also approved during 1996. This project will continue to address enhancements to the Recommendation during 1997.

On the domestic front, TR-30.4 worked on a number of projects:

- Voice Control Standard for Asynchronous DCE, to update and replace Interim Standard IS-101, Facsimile Digital Interfaces-Voice Control Interim Standard for Asynchronous DCE, was balloted in 1996. Publication as TIA/EIA-695 is expected in 1997.
- Modem Command Set Bibliography will be contained in a TSB that will summarize commands from several sources. Part of the work was completed and is contained within Recommendation V.25ter. Although the project is still open, no progress was made during 1996.
- Serial Asynchronous Automatic Dialing and Control for Character Mode DCE on Wireless Data Services, is a proposed standard that was balloted at the end of 1995, with resolution of comments in February 1996. Publication will be held until new Annex D for packet mode commands, developed in 1996, is balloted and approved in early 1997.

Personal Radio Equipment

Wireless consumer communications equipment, such as cordless telephones and citizens band (CB) radios, are the core products for standards within Committee TR-32's realm. In addition, the Committee reviews other TR-32 standards projects in an effort to streamline work and to conduct all Committee management for standards related to CB radios, including maintaining standards, recommending new projects and reviewing work programs for new standards.

1996 Activities

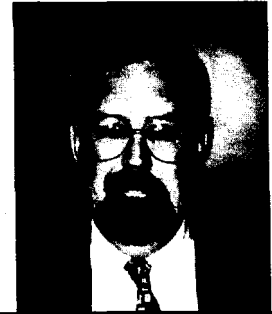
TR-32 voted to reactivate the Citizens Band Radio Subcommittee TR-32.1 with a new work program and to form a new Subcommittee, TR 32.2, to concentrate on cordless telephones.

Chaired by Roger Bisby, Maxon America, TR-32.1's primary responsibility will be to reaffirm EIA/TIA-382-A, Minimum Standards: Citizens Band Radio Service Amplitude Modulated (AM) Transceivers Operating in the 27 MHz Band. EIA/TIA-382-A defines the minimum standards needed to promote transmitter and receiver capabilities within their operating communications systems, but they are not intended as guidelines for definition of high-performance products. New 25-channel model cordless telephones have demanded the establishment of guidelines for "channel occupancy" and a corresponding standard.

Chaired by Jim Haynes, Uniden America Corporation, TR-32.2's current work item is to draft a recommended test procedure to verify compliance with the Federal Communi-



Jim Haynes



*Chair, TR-32
Chief Engineer,
Uniden America Corporation*

vice chair:



Roger Bisby
Maxon America

subcommittees:



Citizens Band Radio
Chair: Roger Bisby
Maxon America



Cordless Telephones
Chair: Jim Haynes
Uniden America Corporation

cations Commission (FCC) requirement that cordless telephones using any of the 15 new channels adopted in 1995 will not establish a link on an occupied channel. Additionally, TR-32.2 will focus on the Measurement Procedure for Cordless Telephones which will demonstrate adherence to the FCC's mandated requirement that cordless telephones may only transmit on "clear" (vacant) channels. The FCC, however, left the definition of "clear channel" open for broad interpretation. TR-32.2 will also be prepared to undertake any additional technical work items as suggested by the Wireless Consumer Communications Section. *

Satellite Equipment and Systems

It has been just over one year since TIA, through the auspices of its member companies, created the Satellite Communications Division (SCD). Since TIA inaugurated the SCD in response to the wide growth and proliferation of regional and international satellite systems, the Division and its Standards Committee, TR-34, have sought to ensure the proper role of satellites in the National and Global Information Infrastructures (NII/GII). The emerging need for collaborative standards development work to enable interoperability and interconnectivity between different existing and planned networks and systems, and eventually to result in ubiquitous, anywhere, anytime communications, is becoming increasingly apparent to the telecommunications industry. Sections, technical committees and subcommittees supporting the SCD provide a natural internal link between the fixed services (FS), mobile satellite services (MSS) and fixed satellite services (FSS).

1996 Activities

After a period of inactivity, TR-34 was reactivated in 1996. Previously, the Committee was sponsored by TIA's Network Equipment Division. The reactivation process included redefinition and expansion of the technical activities to meet the SCD's requirements. The first meeting of the new TR-34 was held in August 1996 at which time David Carroll, Motorola, Inc., was appointed chairman.

Two subcommittees were also established: TR-34.1 is concerned with communications and interoperability issues and TR-34.2 addresses spectrum and orbit utilization issues, reflecting the SCD's two-section structure. Chairs of TR-34.1 and TR-34.2 are Prakash Chitre of COMSAT Network Systems and Carroll, respectively.

TR-34.1's eight working groups address issues relating to interoperability of the satellite and terrestrial components of communications systems. Specific issues include Asynchronous Transfer Mode (ATM) speech, ATM traffic and congestion control, ATM quality of service, data protocols, call and connection management, mobile satellite services, security and interoperability reference models.

TR-34.2 addresses the issue of spectrum sharing between the FS and MSS in the 2 GHz band. This topic is

of current interest because of recent World Radio Communication (WRC 95) decisions, the development of the third generation of personal communications services (PCS) architecture, and pending Federal Communications Commission (FCC) decisions relating to the 2 GHz band. TR-34.2 has formed a Joint Working Group with TR-14.11, Interface Criteria for Microwave Systems, to determine whether, and under what circumstances, this band can be shared between these two services. This joint activity is expected to be completed by mid 1997 and will result in a Telecommunications Systems Bulletin (TSB) to be made available to the FCC to represent industry's position. *



David Carroll

*Chair, TR-34
Technical Staff Engineer,
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subcommittees:

TR-34.1

Communications and Interoperability

Chair: Prakash Chitre
COMSAT Network Systems

Spectrum and Orbit Utilization

Chair: David Carroll
Motorola, Inc.

User Premises Telephone Equipment Requirements

TR-41 develops and maintains voluntary standards relating to telecommunications terminal equipment and systems. These standards primarily focus on equipment, systems and networks used for voice service, as well as integrated voice and data service. This work includes premises distribution systems and wireless Customer Premises Equipment (CPE).

The standards include service and performance criteria for equipment, systems and networks, as well as information necessary to ensure proper interworking with each other, with public networks and carrier-provided private-line services. TR-41 also addresses all aspects of in-building wiring, formulates positions and proposals for the harmonization of regulatory, safety and environmental requirements, and addresses relevant actions of regulatory agencies.

1996 Activities

TR-41 efforts covered a broad range of activities including updating and preparing standards for voice products, premises wireless products and premises wiring, and harmonizing standards between the European Telecommunications Standards Institute (ETSI) and TIA. TR-41 has also prepared standards in response to regulatory actions and has been a focal point for preparing responses for TIA to Federal Communications Commission (FCC) technical dockets. Finally, TR-41, in conjunction with TIA's International Committee, has developed a TIA position on global product conformity assessment processes.

During 1996, Subcommittee TR-41.1, Multiline Terminal Systems, completed its work on a major revision of the Private Branch Exchange (PBX) Standard which was published in April. It also completed its work with ETSI on a Telecommunications Systems Bulletin (TSB) comparing PBX transmission requirements in standards ANSI/TIA/EIA-464-B and ETSI 300 439. TR-41.1's standard on Enhanced 911 calling was approved for ballot and is expected to be published in early 1997. The standard states a uniform method for public service entities, carriers and jurisdictions for the provision of Enhanced 911 services for users of multiline telephone systems.

Future activities with ETSI include updating the ETSI and TIA transmission loss plan applications guidelines. TR-41.1's key focus of activity for 1997 will be on Integrated Services



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subcommittees:

Multiline Terminal Systems

Chair: John Schick
NORTEL (Northern Telecom)

Conformity Assessment

Chair: Pierre Adornato
NORTEL (Northern Telecom)

Residential Terminals

Chair: Dennis Rittenhouse
University of Waterloo

Network Channel Terminating Equipment Standards

Chair: vacant

Multimedia - Building Distribution Systems

Chair: Jim Romlein
MIS LABS

Wireless User Premise Equipment Systems

Acting Chair: William Cruz
Lucent Technologies, Inc.

Environmental and Safety Considerations

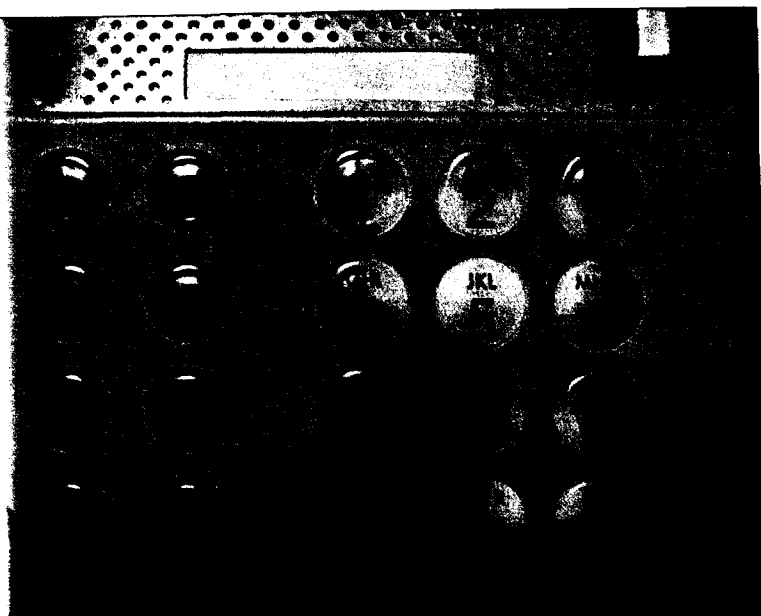
Chair: Roy Baker
RELTEC

Commercial and Residential Building Cabling Systems

Chair: George Lawrence
AMP Incorporated

Terminal Attachment Programs

Chair: Anh Wride
Communication Certification Laboratory



Digital Network (ISDN) networking and Private Signaling System 1 (PSS1) signaling.

Subcommittee TR-41.2, Conformity Assessment, completed its paper on a North American view of global conformity assessment issues. Conformity assessment procedures, used directly or indirectly, determine that a technical regulation or standard is fulfilled, including sampling, testing, inspection, evaluation, verification, monitoring, auditing, assurance of conformity, accreditation or registration, but do not necessarily indicate an approval procedure. This paper served as a principal source document in developing TIA's policy position on global conformity assessment. TR-41.2 serves as the standards and regulatory liaison with the TIA International Committee to develop implementation plans for this policy. The first topic to be addressed is the simplification of labeling requirements.

During the year, Subcommittee TR-41.3, Residential Terminals, completed its work on a standard for telephone Hearing Aid Compatibility (HAC). This work was done jointly with the Canadian Standards Association (CSA). TR-41.3 also served as the industry focal point for the FCC Order regarding hearing aid compatibility specifying the use of volume controls. Two new standards projects are underway in TR-41.3: CPE performance and interoperability for enhanced calling features and a revision of acoustic-to-digital and digital-to-acoustic transmission requirements for ISDN terminals and changing loudness specification in its standards to International Telecommunication Union Telecommunication Standardization Sector (ITU-T) ratings. Working Group TR-41.3.1, Caller Identification, is developing performance standards for enhanced calling features to ensure interoperability of equipment from different manu-

facturers and network compatibility. There are currently some interoperability issues that require resolution.

TR-41.5, Multimedia-Building Distribution Systems, balloted for public review its proposed standard on multimedia premises reference architecture. This Standard Proposal establishes an architectural framework for end-to-end multimedia communications and is intended to be independent of media, platform, access network and technology. The proposed standard will fill a need in the telecommunications industry brought about by National and Global Information Infrastructures (NII/GII).

TR-41.6, Wireless User Premise Equipment Systems, has begun work on wireless mobility management which will address personal user mobility, expected to be completed in Fall 1997. The Subcommittee is expected to complete its work on a personal wireless telecommunication standard by early 1997.

TIA/EIA-631, Telecommunications Telephone Terminal Equipment - Radio Frequency Immunity Requirements for Equipment Having an Acoustic Output, developed by TR-41.7, was published in May 1996. Work on this standard was initiated on behalf of the FCC in response to receiving 25,000 complaints each year on telephone RF interference. The sources of interference include AM/FM broadcasters, licensed amateur operators and citizens band transmitters. Most of these sources were operating according to their respective licensing limitations. The FCC also issued a Notice of Inquiry (NOI) early in 1996 asking whether telephones should be regulated for RF immunity. TIA, with input from TR-41.7, prepared a response to this NOI and has met with the FCC to persuade it to allow manufacturers time to implement this standard voluntarily. TR-41.7 will continue to work closely with the FCC on technical aspects of this matter.

TR-41.7's other active projects include a revision of TIA/EIA-571-A, Telecommunication User Equipment Environmental Considerations, and the provision of TIA input into the IEC 950, Safety of Information Technology Equipment, including Electrical Business Equipment. This revision recommends changes to the telecommunications industry in two major environmental areas: lightning surge and Electrostatic Discharge (ESD). The lightning surge recommendations are considered a better representation of the environment and complement the changes recommended to the FCC in the Canada/U.S. harmonized Part 68 filing, submitted early in 1996. The new ESD recommendations were updated to reflect the changes in the international

ESD testing methods in IEC-801-2 Second Edition and are harmonized with the Committee T1 Central Office ESD Standard T1.308-1996.

The TR-41.8 Subcommittee, Commercial and Residential Building Cabling Systems, continues to be the foremost developer of premises distribution standards and practices. These standards are used well beyond the telecommunications industry and have become TIA's most widely sold and publicized standards. TR-41.8.1 is working on clarifications to TIA/EIA-568-A, Commercial Building Telecommunications Cabling Standard, and has added several addendums. This standard defines a generic telecommunications wiring system for commercial buildings that will support a multiproduct, multivendor environment. TR-41.8.3 is currently revising TIA/EIA-569, Commercial Building Standard for Telecommunications Pathways and Spaces, which standardizes specific design and construction practices within and between buildings. The revision of TIA/EIA-569 is expected to be released in 1997.

TR-41.9, Terminal Attachment Programs, provides technical input to the FCC and TIA on regulatory matters of Title 47, Code of Federal Regulations, Part 68. It continues to work on harmonization of FCC Part 68 and Industry Canada CS-03. At the request of the FCC, TR-41.9 is also working on identifying areas for harmonization of new technologies (e.g., asymmetrical digital subscriber line). In line with the expected Order for the new Part 68 technical requirements, TR-41.9 has a recent version of its test guidelines TSB-31-B ready for approval and publication. The Order added ISDN and Public Switched Digital Services (PSDS) to Part 68 of the FCC's rules. TIA filed comments asking for clarification and reconsideration of the Order, as technical and editorial clarifications were needed. In addition, TIA sought clarification on what is intended for plugs and jacks to be used with ISDN and PSDS, as well as HAC and volume control requirements for these services.

In the international arena, TR-41 continues to provide its expertise to working groups of the Consultative Committee Telecommunications (CCT), the private sector group

supporting the government's implementation of the telecommunications section of the North American Free Trade Agreement. TIA is the U.S. secretariat for the CCT; TR-41 Chair Charles Berestecky is chairman of the CCT. TR-41, through TR-41.2 and TR-41.9, continues to provide standards and technology input on certification guidelines or Mutual Recognition Agreements (MRA) being negotiated by the U.S. government with other regions or countries. MRAs are important for the telecom and wireless industries. Without conflicting conformity programs, manufacturers can save as much as 90 percent on product testing. Because of the nature of today's telecom industry's short product life cycles, regulations can negatively impact products. A product's approval time directly affects its speedy introduction to market and the short period of time to make up costs and reap profits. MRAs seek to hasten these approvals and help the industry get products to market faster and easier.



Mobile and Personal Communications Systems

The TR-45 Committee is responsible for performance, compatibility, interoperability and service standards for public mobile and personal communications systems, 800 MHz and 1800 MHz.

1996 Activities

TR-45 developed several new standards and revisions for the TR-45 family of standards to incorporate new capabilities and services, particularly in support of Personal Communications Services (PCS). This year has also been noteworthy in terms of the number of TR-45 standards that have been put forth as American National Standards (ANS) publication. With more than 25 TIA and ANS standards published, 1996 was a year of great accomplishment.

TR-45 continues its interest in international usage and application of its standards and has created an ad-hoc group to plan and coordinate TR-45 activities to support promotion and recognition of North American wireless-based standards among international forums such as the International Telecommunication Union (ITU). Several contributions have been submitted to the ITU's Radiocommunication and Telecommunication Standardization sectors focusing on digital voice coder technologies (IS-641, TDMA Cellular/PCS-Radio Interface Enhanced Full-Rate Codec, and IS-96-B, Speech Service Option Standard for Wideband Spread Spectrum) and the Wireless Intelligent Network (WIN).

Work continues in TR-45 to develop standards to support legislation such as the Communications Assistance for Law Enforcement Act (CALEA). This effort is unique since its scope may cover electronic surveillance standards for both wireless and wireline. Members of law enforcement and the Federal Bureau of Investigation (FBI) have been working closely with the industry to ensure standards that meet the legislative intent. TR-45.2, Cellular Inter-System Operations, has been responsible for the Joint Standards Document (JSD) work with Committee T1 sponsored by the Alliance for Telecommunications Industry Solutions (ATIS), on Lawfully Authorized Electronic Surveillance. A special ad-hoc group has been formed to address this project, known as PN-3580, scheduled for ANSI ballot in early 1997.

TR-45 has recently formed an ad-hoc group to investigate standards for Operations, Maintenance, Administration, and Provisioning (OMA&P) for wireless networks.



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Lucent Technologies, Inc.*

subcommittees:

TR-45.1

Analog Cellular Technology

Chair: Tony Akers
Motorola, Inc.

Cellular Inter-System Operations

Chair: Cheryl Blum
Lucent Technologies, Inc.

Digital Cellular Technology

Chair: Peter W. Nurse
Lucent Technologies, Inc.

Microcellular/ PCS Technology

Chair: Stephen S. Jones
NEC America, Inc.

Wideband Spread Spectrum Digital Technology

Chair: Jean Alphonse
Ameritech Mobile Communications

TR-45 also has an ad-hoc group investigating and defining requirements for Wireless Local Loop (WLL) for fixed applications. An ad-hoc group on Electronic Serial Number (ESN) administration is developing a draft proposal for an ESN administration process. The FCC has indicated its desire to relinquish control of ESN assignment and has suggested that TIA (TR-45) assume the administration process. In December 1996, TR-45 also created a new ad-hoc group responsible for developing a work program to address standardization of Cellular Digital Packet Data (CDPD).

One of the major activities in the TR-45.1 Subcommittee, Analog Cellular Technology, is work on Revision A of EIA/TIA-553, Mobile Station-Land Station Compatibility Specification, as the core analog standard. TR-45.1 is working closely with TR-45.3 and TR-45.5 on this common core

document. In addition, TR-45.1 has proceeded with work on standards to support Narrowband Advanced Mobile Phone Service (NAMPS) at 1800 MHz bands.

TR-45.2 has completed the ANSI ballot process for IS-41 Revision C, Cellular Radio Telecommunications Inter-system Operation, to be published as ANSI/TIA/EIA-41. This revision is particularly significant due to its feature richness. Not only does IS-41-C support analog and digital air interface technologies (such as Time Division Multiple Access (TDMA), and Code Division Multiple Access (CDMA), etc.), but it also supports more than 20 PCS services, such as calling number presentation, incoming call screening features and short message service. It supplies authentication capabilities necessary for fraud prevention and control, and voice privacy service. It also provides the framework for support of WIN with the inclusion of procedures to support an intelligent Home Location Register (HLR). In addition, TR-45.2 is working with Committee T1 on a JSD in support of emergency services. Telecommunications Systems Bulletin TSB-76, Enhancement for PCS Multi-Band Support, has been issued supporting PCS Multi-Band capabilities (i.e., handoffs between bands and radio frequencies).

Additional PCS services addressed by the Subcommittee include network support for Over-The-Air Service Provisioning (OTASP), data services, and support of new capabilities introduced with IS-95 Revision A, Mobile Station-Base Station Compatibility Standard for Dual Mode Wideband Spread Spectrum Cellular System, and IS-136, 800 MHz TDMA Cellular. The Subcommittee continues its work on WIN with the development of new interfaces to support intelligent network functional entities such as Service Control Points (SCPs), Intelligent Peripherals (IPs) and Service Nodes (SNs). The purpose of WIN is to build the framework and platform to allow service creation. The Subcommittee is also addressing standards internationalization (e.g., International Mobile Station Identity (IMSI), Sig-

naling System 7 (SS7) routing and global title translation) to support global applications. Revision A of IS-124, Cellular Radio Telecommunications Intersystem Non-signaling Data Communications, related to call detail recording, will undergo the ballot process in early 1997. This document contains clarifications to Revision 0, support

for new services introduced in IS-41 Revision C, and support for IMSI.

Subcommittee TR-45.3,

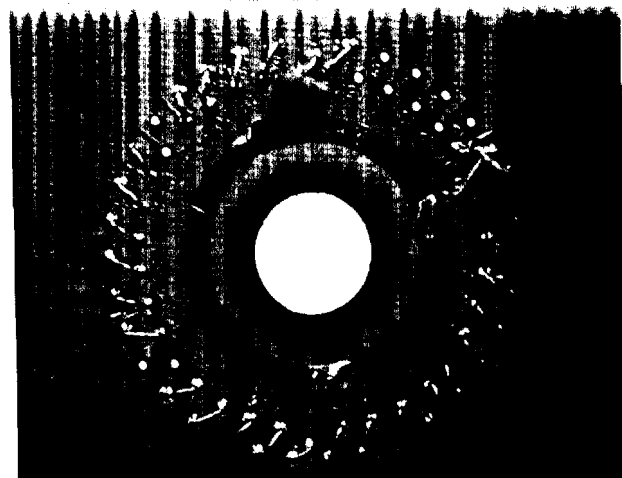
Digital Cellular Technology, has deleted IS-137 Revision A and IS-138 Revision A TDMA Cellular PCS - Radio Interface - Minimum Performance Standards for Mobile Stations and for Base Stations, respectively. Work has been completed on incorporation of 1800 MHz support in IS-136, Digital Control Channel Standard and standards for new PCS features and services, such as OTASP. The Subcommittee also completed work on IS-641, Enhanced Full Rate Digital Speech Codec. TR-45.3 has also begun work on standards to support TDMA 800 MHz and 1800 MHz Packet Switched Data Services.

TR-45.4, Microcellular/PCS Technology, continues its work on the next revision of IS-634, MSC-BS Interface for Public 800 MHz, the switch to base station interface (A-Interface). Revision A will incorporate frame relay as a transport protocol for the A-Interface. The Subcommittee has completed work on TSB-80, Discrepancies/Enhancements to MSC-BS Interface for Public 800 MHz, providing clarifications to the first revision of TIA/EIA/IS-634, MSC-BS Interface (A-Interface) for Public 800 MHz.

Subcommittee TR-45.5 has completed work on two digital speech coders: IS-127, the Enhanced Variable Rate Codec and IS-96 Revision B. Work on TSB-74, Support for 14.4 Kbps Data Rate and PCS Interaction for Wideband Spread Spectrum Cellular Systems, also concluded this year. TSB-74 describes the alignment of PCS services in IS-95; IS-95 Revision B will complete incorporation of the combined services and capabilities of cellular and PCS. TR-45.5 has also completed work on OTASP (IS-683), Packet Data Services (IS-657), and interworking capabilities needed to support data services (IS-658). New efforts underway in the Subcommittee include work on services such as system selection for preferred roamers and programming lock.

The TR-45 Ad-Hoc Authentication Group continues to provide support for the work of the subcommittees with security and privacy matters, particularly related to the work on OTASP, data encryption and upcoming work on features such as system selection for preferred roamers.

In 1997, TR-45 will continue its important work on support for 800 MHz and 1800 MHz PCS, striving to match the great success of 1996. •



Mobile and Personal Communications

TR-46 develops and maintains performance, compatibility, interoperability and service standards for the personal communications services (PCS) band, now commonly referred to as the 1900 MHz band.

1996 Activities

In the first quarter of 1996, TR-46 underwent a reorganization as a result of the discontinuation of the Joint Technical Committee meetings between Committee T1, sponsored by the Alliance for Telecommunications Industry Solutions (ATIS), and TIA. Process issues and work allocation of the joint standards developed by both groups were determined and a detailed implementation plan for the Joint Standards Document (JSD) was developed. A portion of joint standards work was transferred to Committee T1, which will be the lead body in the maintenance of its work allocated joint standards. The other portion of the joint standards work was allocated to TIA's Engineering Committees, TR-45 and TR-46, which will be the lead bodies in the maintenance of TIA's portion of the joint work.

Early in 1996, agreements between TR-45 and Committee T1P1, System Engineering, Standards Planning and Program Management, led TR-46 to reorganize to reflect its new work and work methods. Due to the close collaboration with T1P1, it was decided that the structure of the two committees should be as closely aligned as possible to facilitate efficiency. Currently, TR-46 is composed of three subcommittees. TR-46.2, Network Interfaces, focuses on the work which is of cross-technology nature. TR-46.5, PCS 1900, concentrates on the enhancement and evolution of the PCS 1900 family of standards. TR-46.6, Composite CDMA/TDMA, develops and enhances the standards for the composite CDMA/TDMA family. It is expected that other subcommittees will be formed during 1997 to reflect additional technologies represented within T1P1 which are not currently reflected in the TR-46 structure.

TR-46 develops documents that cover systems engineering for the service descriptions, network architectures, and functional and physical aspects of personal communications, which are applicable to both wireless and wireline access and to the networking between systems. This Committee develops American National Standards (ANS), Interim Standards (IS), Telecommunications Systems Bulletins (TSBs), and positions and technical contributions on related



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vice chair:

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subcommittees:

Network Interfaces

Chair: Don Zelmer
Bellsouth Mobility DCS

PCS 1900

Chair: Ed Ehrlich
NORTEL (Northern Telecom)

Composite CDMA/TDMA

Chair: Gary Jones
Omnipoint Technology

subjects under consideration in other domestic and international standards forums. TR-46 develops standards and technical reports relevant to the service descriptions, functional analysis, and network architectures of personal communications for U.S. telecommunications networks and reviews as well as prepares contributions in these areas for the International Telecommunication Union's Telecommunication Standardization and Radiocommunication Sectors' Study Groups.

TR-46 also maintains close liaison with other TIA standards committees, such as TR-41 and TR-45, as well as external organizations such as Committee T1, T1P1, the Institute of Electrical and Electronics Engineers (IEEE), the European Telecommunications Standards Institute (ETSI), and other industry organizations.

The issue of PCS-to-PCS interference has become increasingly important especially with the development of the six PCS air interfaces completed by the Joint Technical Committee (JTC) in 1995. The JTC completed six American National Standards and two interim standards. Future revisions of these documents will not be handled by JTC but rather by a lead organization as per the agreement between TIA and Committee T1.

J-STD 007, Recommended Minimum Performance Requirements for Base Stations Supporting 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Stations

J-STD 008, Personal Station-Base Station Compatibility Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Communications Systems

J-STD 009, PCS 1900 MHz IS-136 Based Mobile Station Minimum Performance Standard

J-STD 010, PCS 1900 MHz IS-136 Based Base Station Minimum Performance Standard

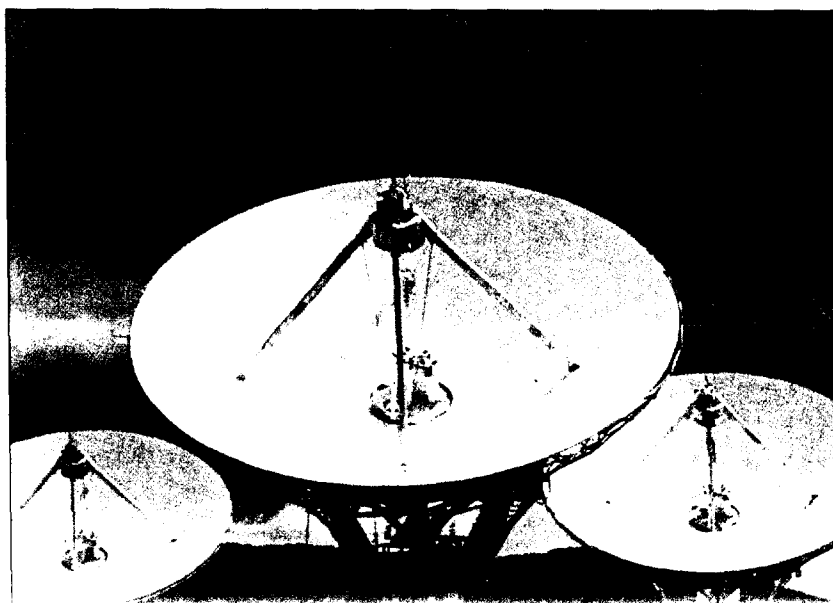
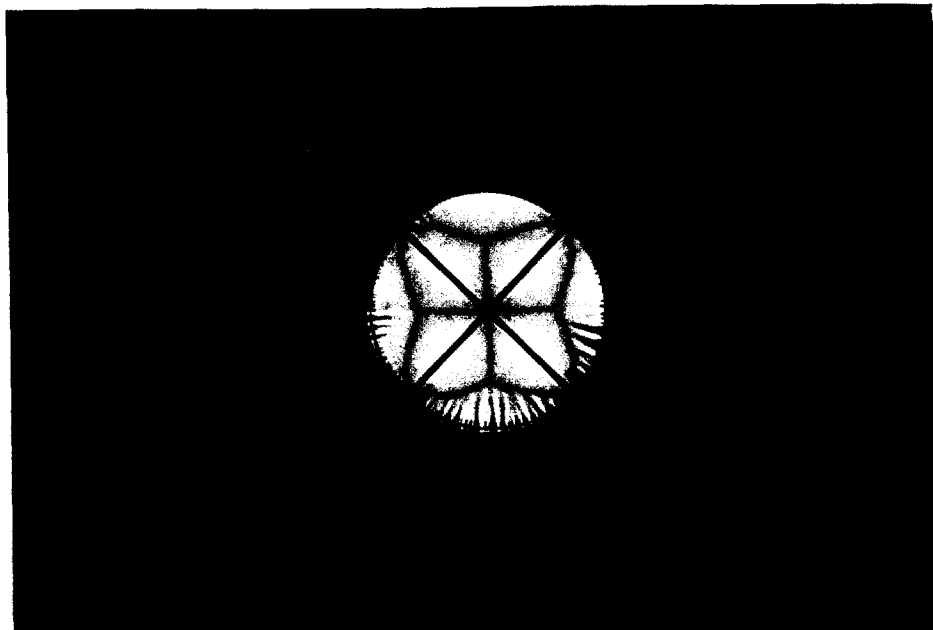
J-STD 018, Recommended Minimum Performance Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA)

J-STD 019, Recommended Minimum Performance Requirements for Base Stations Supporting 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Station

Two Interim Standards — A Composite CDMA/TDMA (Time Division Multiple Access) Air Interface Compati-

bility Standard for Personal Communications in 1.8 to 2.2 GHz for Licensed and Unlicensed Applications (IS-661) and W-CDMA (Wideband Code Division Multiple Access) Air Interface Compatibility Standard for 1.85 to 1.99 GHz PCS Applications (IS-665).

An important cross technology project was approved by the Technical Standards Subcommittee (TSSC) to develop a Telecommunications Systems Bulletin (TSB) covering the area of PCS-to-PCS interference. This project was assigned to TR-46.2, Network Interfaces. The TSB will initially focus on the interference issues associated with outdoor systems. Subsequently, there will be a revision which will describe the interference issues associated with indoor systems. This TSB will aid the National Spectrum Managers Association in developing the guidelines for PCS systems and provide interference guidance for the service provider community. •



Committee on Optical Communications Systems

FO-2's charter is to develop physical-layer Optical Fiber System Test Procedures (OFSTPs), systems design guides, and system specifications to assist both suppliers and users of fiber optic communications technology. The Committee's emphasis is on the arrangement of components into a fiber optic link, rather than on the individual components themselves. The OFSTPs provide a standard way of measuring system parameters so that results obtained by suppliers and users are in agreement. Interoperability and multivendor compatibility are foremost concerns of this Committee's work.

FO-2's five systems subcommittees address single-mode digital and analog systems, including optically amplified systems with Wavelength-Division-Multiplexing (WDM); multimode fiber and multimode systems, primarily point-to-point local area network applications (FO-2.2); optical system terms, definitions and symbols (FO-2.4); optical cable placement (FO-2.5); and system and active component reliability (FO-2.1/6.6). Some FO-2 subcommittees work jointly with the FO-6 Committee on Fiber Optics.

1996 Activities

During the year, progress was made on several guideline documents. TIA/EIA-626, Multimode Fiber Optic Link Transmission Design, was published in January. A less-detailed version is under consideration in the International Electrotechnical Commission (IEC). FO-2 continues to revise TIA/EIA-559, Single-Mode Fiber Optic Transmission Design, to include longer wavelengths, higher bit-rates, optical amplifiers and WDM. Revised TIA/EIA-590, Standard for Physical Location and Protection of Below Ground Fiber Optic Cable Plant, currently resides in TIA's Technical Standards Subcommittee, while TIA/EIA-610, Procedure for Calculating Optoelectronic Device Reliability, is being revised after balloting.

Several test methods have been revised and are in ballot. These are OFSTP-4, Optical Eye Pattern Measurement Procedure; OFSTP-6, Procedure for System Level Temperature Cycle Endurance Test; and OFSTP-7, Optical Power Loss Measurements of Installed Single-Mode Fiber Optic Cable Plant. A fundamental test determining the operability of digital systems, OFSTP-4 is a significant improvement

in repeatability and accuracy over the previous version. OSFTP-6 is an important test to ensure network terminal equipment is environmental reliability. OFSTP-7's significance is in measuring an important property of installed systems. If the loss is too high, the fiber optic link will not function.

Two new drafts produced this year are OFSTP-5, Extinction Ratio Measurement Procedure, and OFSTP-8, Accelerated Measurement of Low Bit Error Rates (BERs) in Digital Fiber Optic Systems.



Felix P. Kapron

*Chair, FO-2
Principal Engineer,
BELLCORE*

subcommittees:

FO-2.1/6.6 Joint Subcommittee on Single-Mode Systems

Chair: Allen Cherin
Lucent Technologies, Inc.

Subcommittee on Local Area Networks

Chair: Jim Kevern
AMP Incorporated

Subcommittee on Optical Terms, Definitions, Document Control, and Safety

Chair: Joyce Kilmer
OPTOTEC

Subcommittee on Outside Fiber Cable Plant

Chair: Paul Devaney
BELLCORE

FO-2.1/6.6 Joint Subcommittee on Reliability of Fiber Optic Systems and Active Optical Components

Chair: Hakan Yuce
BELLCORE

Of renewed interest are multimode issues because of the advent of high-speed Local Area Networks (LANs). Consequently, some standards are being revised, including Fiber Optic Test Procedure FOTP-46, Spectral Attenuation of Long-Length Graded Index Fibers; FOTP-53, Insertion Loss of Long-Length Graded Index Fibers; and FOTP-54, Mode Scrambler Requirements for Overfilled Launching Condition to Multimode Fibers. OFSTP-15, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant, is now being reviewed by TIA's Technical Standards Subcommittee.

Analog test procedures for video systems are being rebaloted and are also being reviewed by the Society of Cable and Telecommunications Engineers (SCTE): OFSTPs 21 to 23 cover receiver sensitivity, carrier-to-noise ratio, and cross modulation, while OFSTPs 25 and 26 cover composite triple-beat noise and composite second-order distortion. TIA and SCTE are working together in this area of standards development by exchanging information. In this way, each standards-developing organization can benefit from the area experts of the other and standards development duplication can be avoided.

Finally, EIA/TIA-587, Fiber Optic Graphic Symbols, is in the process of being reaffirmed as American National Standard.

Liaison continues to be maintained with the Alliance for Telecommunications Industry Solutions' Committee T1 Working Group X1.5, Optical Hierarchal Interfaces, concerning optical amplifiers and WDM. It was agreed that T1X1.5 will be concerned with architectural and operational issues and TIA will treat physical layer aspects.

Internationally, close contact is continuously maintained with relevant international standards bodies such as the International Electrotechnical Commission (IEC) Technical Committee TC86 Fiber Optics, Subcommittee SC86C Fiber Optic Systems, Working Group WG1 on Fiber Optic Systems and Subsystems, and WG3 on Optically Amplified Systems, as well as the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Study Group SG 15 on Transmission Systems and Equipment, and its Working Party WP4 on Optical Transmission.

In these interactions, TIA documents are modified and forwarded as U.S. contributions to international bodies,



such as IEC. The Committee's work on single-mode and multimode system design guidelines is one area that many contributions have been forwarded. The past year saw growing interest in optically amplified subsystems, some incorporating WDM, for which FO-2 serves as a body for U.S. review. Significant work was performed on the controversial subject of WDM frequency allocations. Although no single agreement could be reached among several U.S. organizations, several contributions were made to the ITU. In the reverse direction, FO-2 is adapting international work from the ITU, such as that on extended single-mode systems and analog transmission.

In addition to continuing projects begun in 1996, FO-2's work for 1997 will address several important areas, such as a guideline on polarization-mode dispersion which can limit the bandwidth of long optically amplified systems. Another is a guideline on dispersion compensation that enables conventional 1310-nm fiber to be used in 1550-nm optically amplified systems at long lengths. In addition, a third guideline focusing on analog aspects of optical amplifiers and optically amplified systems, and the gain and noise of optically amplified WDM subsystems will be undertaken. OFSTPs 15 to 18, related to jitter tolerance, jitter transfer function, output jitter, and systematic jitter generation, will be reviewed since some similarity exists in the procedures and equipment of all four documents.

In the year ahead, the continuing thrust of FO-2 will be to produce new system design guidelines, test procedures and specifications that reflect industry needs in the continuing advances of fiber optic communications technology.

Fiber Optics

FO-6 is responsible for developing standards for fiber optic systems components including, but not limited to, fibers, cables, splices, sensors, waveguides, connectors, optoelectronic sources and detectors, related assembly tooling, field tooling, and test instrumentation. The Committee's nine active subcommittees produce standards and specifications for these components, related test methods, terminology and symbols. Work also includes issues related to quality assessment, reliability and product performance.

1996 Activities

Fiber Optic Test Procedures (FOTPs), compiled in the TIA/EIA-455 series of publications, formed a major portion of FO-6's work in 1996. These include FOTPs to test specific optical parameters, such as cross-talk, reflectance and attenuation, as well as mechanical parameters, such as response to vibration, humidity and temperature in different environments. These procedures give fiber suppliers and users a measured numeric value for the parameters and an agreed-upon test method. Approximately 175 fiber optic test procedures are in various stages of completion, with nine newly published in 1996 and an additional nine revised.

The Generic Specification for Fiber Optic Connectors, which allows subsequent connector specifications to better address the needs of customers, was extensively revised and published during 1996.

Additionally, FO-6 published the TIA/EIA-604 which serves as the base document on Fiber Optic Connector Intermateability Standards (FOCIS) and its five intermateability standards are in progress. FOCIS documents provide connector guidelines for vendors to ensure connectors installed in the network will be compatible with those later purchased from another vendor.

The FO-6 Committee also undertook generic, sectional and blank detail specifications for passive optical switches, which were expected to be published at the close of 1996. The seven-document fiber specification set again was prepared for ballot, and FO-6 plans to develop an additional specification for multimode fiber with a 50 micrometer core diameter.

Edward F. Mikoski, Jr.



Chair, FO-6 Manager, Global Fiber Optic Standards Programs, AMP Incorporated

subcommittees:

Fiber Optic Field Tooling & Instrumentation

Chair: Leslie Reith
BELLCORE

Terminology, Definitions & Symbology

Chair: Edwin Sakaguchi
Structural Technologies

Interconnecting Devices

Chair: Tom Ball
AMP Incorporated

Opto-Electronic Sources & Detectors

Chair: Cliff Carlson
NRaD - San Diego

Fibers & Materials

Chair: Greg Smith
Corning Inc.

FO-6.7 Fiber Optic Cables

Chairs: Eric Loytty & Michael Kinard
Siecor Corporation & Lucent Technologies, Inc.

Specification Structure & Processing

Chair: Steven Swanson,
Corning Inc.

Fiber Optic Sensors

Chair: Vincent Martinelli
Corning Inc.

Reliability of Fiber Optic Systems and Active Optical Components

Chair: Hakan Yuce
BELLCORE

During 1996, the Committee conducted studies on the acceleration of failure and on estimating reliability under conditions of temperature-humidity cycling, with attenuation and return loss changes as the failure criteria for passive components. Reliability work also continued on fiber and active devices. These projects are particularly important because, with the emphasis on customer service at an all-time high, it is anticipated uninterrupted service will be assured in the industry, with service providers subject to fines and penalties from public utility commissions or the Federal Communications Commission if reliability is compromised.

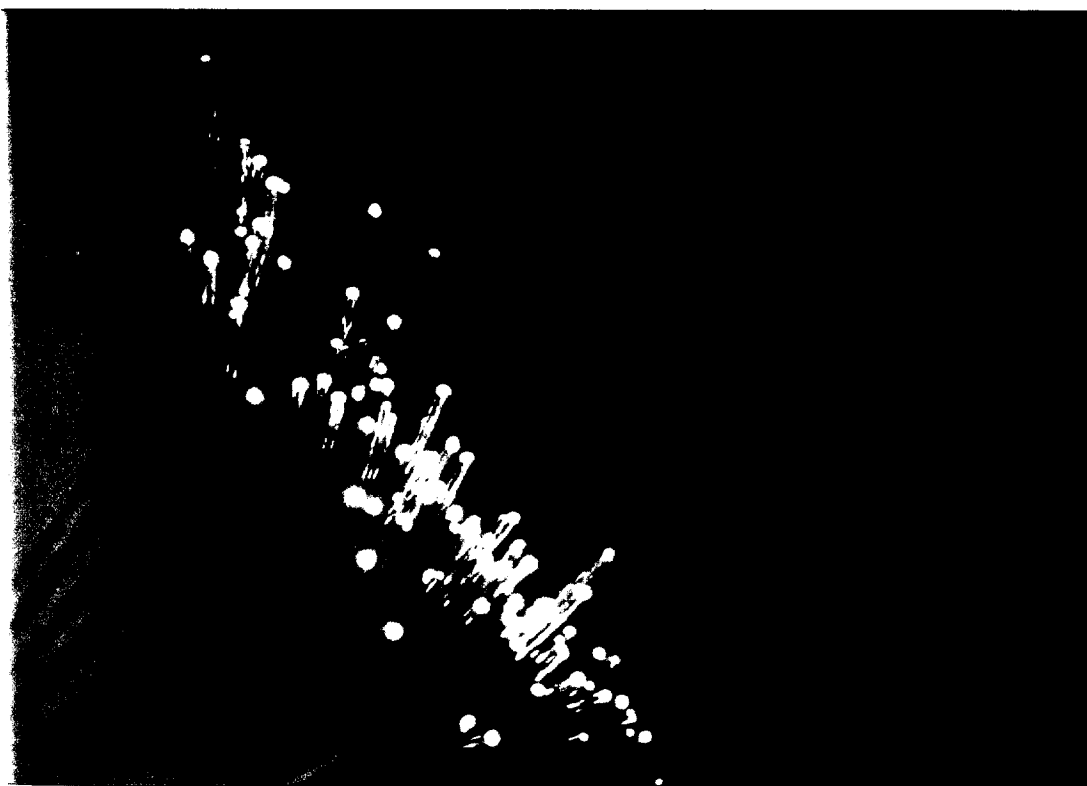
Fiber optic ribbons, a planer array of 4 to 24 fibers glued side-by-side, were declared a stand-alone product in the International Electrotechnical Commission (IEC) SC86A, Fibers and Cables, Working Groups 1 and 3. The glue-based configuration allows better fiber performance and use of space. As the need for cables with small and large-count fiber cables increases, FO-6 is developing new standards for fiber optic ribbons and ribbon cables. Traditionally, the North American market has allowed for fiber ribbon only as needed, but European fiber manufacturers now offer fiber ribbon as a stand-alone product, expanding the need for North American standards in this area.

Liaison work between FO-6 and other organizations is growing significantly. The Committee has extensive

involvement in the international standards development community through contributions prepared for the International Telecommunication Union, and participation in the Technical Advisory Groups (TAGs) for the related committee work in the IEC. The TAGs meet in conjunction with the FO-6 and FO-2 committees to foster harmonization of national and international work.

Liaison work also is expanding with other standards development organizations. For example, FO cable specifications are being coordinated with those of the Insulated Cable Engineers Association (ICEA). Work continues on detail specifications for SC and BFOC connector types to support the TIA/EIA-568-A, Commercial Building Telecommunications Cabling Standard, and work has begun on plastic optical fiber and related components in support of the ATM (Asynchronous Transfer Mode) Forum, an industry group focused on the development, standardization and deployment of ATM products.

The coming year promises to be a productive one as the need for network reliability continues to be a top priority as the national information infrastructure develops and fiber remains a crucial component in the infrastructure. The FO-6 Committee will examine its classification of fiber optic test procedures and as necessary regroup them to better mirror classifications developed by international standards bodies. *



Companies Which Participate in Engineering Committees

- * 3COM Primary Access Corporation
- * 3M Telecom Systems Division
- * ACE*COMM
- * Action Consulting
- * ADC Telecommunications, Inc.
- * ADI LTD, Systems Group
- * Adirondack Wire and Cable
- * ADTRAN
- * Advantest America, Inc.
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- * Alcoa Fujikura Ltd.
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- * Aldiscon, Inc.
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- * EXFO E.O. Engineering, Inc.
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- * Fujitsu Network Communications
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- * LG Infocomm, Inc.

Companies Which Participate in Engineering Committees

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